Global Ocean Data Assimilation Experiment (GODAE) High Resolution Sea Surface Temperature Pilot project (GHRSST-PP)

Data Product Specification

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1. Introduction

This document is for groups or individuals who use satellite derived sea surface temperature (SST) data sets and especially those interested in their real time application. It provides a summary of the global SST data products that will be produced, in real time and in a delayed reanalysis mode, by the Global Data Assimilation Experiment (GODAE) high-resolution sea surface temperature pilot project (GHRSST-PP).

The GHRSST-PP has been established to provide international focus and coordination for the development of a new generation of global, multi-sensor, high-resolution (better than 10 km), sea surface temperature (SST) products provided in real time (6 hourly). It provides a major contribution to the GODAE Common (Bell et al., 2002) as a measurement network as described in the GODAE implementation plan (Smith et al., 2002). Its primary aim is to oversee the development, timely delivery, assembly and processing high-quality, global scale, SST products at a fine spatial and temporal resolution, for the diverse needs of GODAE and the wider scientific community. Against this background, the broader objective of the GHRSST-PP is to provide focus and coordination for the sustained development and application of a new generation of global, high-resolution, SST products.

The coordination and implementation preparations for the GHRSST-PP commenced at the first GHRSST-PP workshop held in November 2000. The GHRSST-PP ***preparation phase*** is mainly concerned with engaging and consolidating the GHRSST-PP community and implementation of the basic GHRSST-PP. It will run until July 2003 cumulating in an operational demonstration of "version 1.0" GHRSST-PP products and services.

The preparation phase will be superseded by the GHRSST-PP ***demonstration phase*** that will continue until the end of 2005. During the demonstration phase, GHRSST-PP data products and services will be continually refined and made available, in real time, to the broad GHRSST-PP user community. Throughout the demonstration phase, a parallel and continual process of project development and refinement is foreseen with particular emphasis on the improvement of demonstration data products and delivery to operational users.

During 2004-2005, data products will be provided to a number of specific operational users who will work closely with the GHRSST-PP Science Team to evaluate the products using a variety of specific applications demanding real time high-resolution SST data products. Dedicated model runs, inter-comparison exercises and assimilation experiments will all take place in real time. This period is called the GHRSST-PP ***intensive application phase***.

2. Product Specifications and Data Streams.

During the 2nd GHRSST-PP Workshop "Removing the Barriers to the implementation of the GHRSST-PP", Tokyo, May 2002, the GHRSST-PP Science Team (ST) agreed on the specification of the project data products. Three types of GHRSST-PP SST demonstration products will be produced: merged products, analyzed products and reanalysis products.

Merged products consist of L2a collated separate satellite data streams that have been calibrated cleared of cloud re-gridded to a common grid format. Each data set will be produced at the highest spatial and temporal resolution possible and will have variable spatial and temporal resolution. No interpolation or combined analysis will be performed. Merged data products retain all of the error statistics derived from error coding schemes based on in situ data sets for each pixel in each input data set. These products are volatile, changing as new data arrives in real time but will be consolidated and archived at 6 hourly intervals corresponding to the synoptic Meteorological forecast times. Due to high data volumes and time constraints, only a moderate level of quality control may be possible. These products are expected to serve the ocean modeling community.

In contrast, ***analysed products*** are derived from the combined analysis of all merged products produced at 12 hourly intervals corresponding to the synoptic Meteorological forecast times. Analyzed data products have a single output grid together with confidence data including a diurnal signal mask, sea ice mask and a set of confidence flags. Error statistics consist of a mean bias and rms. estimate for each grid point derived from a combination of errors due to the analysis methodology and error coding schemes based on in situ data sets for each pixel in each input data set. A high level of quality control is expected. Analyzed data are permanent data that are initially archived but will be reanalyzed within 7 days of archive as a final delayed mode data set. These products are expected to serve the NWP and ocean modeling community.

Finally, ***reanalysis products*** are derived in a delayed mode 7-14 days after data reception to take advantage of additional data sources unavailable in real time, particularly in situ observations and satellite data sets. The highest level of quality control will be performed on these data that will be produced at 6 hourly intervals. Analyzed products are expected to serve the climate and general user community.

A summary of GHRSST-PP data products is provided in Table 1.

Table 1. GHRSST-PP data product specification.

Characteristic	Merged SST	Analyzed SST	Reanalyzed SST
Grid Size	Better than 10 km	Better than 10 km	Better than 10 km
Temporal resolution	6 hours	12 hours	6 hours
Delivery timescale	Real time	Real time	7-28 days following data reception
Accuracy	< 0.5 K absolute 0.1 K relative	< 0.5 K absolute) 0.1 K relative	< 0.3 K absolute (target), 0.1 K relative
Error statistics	rms. and bias for each input data stream at every grid point	rms. and bias for each output grid point (no input data statistics are retained)	rms. and bias for each output grid point (no input data statistics are retained)
Coverage	Regional (Best effort Global)	Global, (Regional extracted)	Global
SSTskin product	Yes	Yes	Yes
SSTsub-skin product	Yes	Yes	Yes
SST1m product	Yes	Yes	Yes
Cloud mask	For each input data set	Yes	Yes
Confidence data	No	Yes (sea ice information, diurnal warming mask, quality flags)	Yes (sea ice information, diurnal warming mask, quality flags)
Nominal product format	Hdf/GRIB/NetCDF	Hdf/GRIB/NetCDF	Hdf/GRIB/NetCDF

For further information on the GHRSST-PP please see http://www.ghrsst-pp.org.

GHRSST-PP Science Team, June 19th 2002.